CONCLUSIONS Integration of available peri-procedural CT TAVR annuls data minimizes balloon under sizing & improves PABV results. A BA to CT-TAVR AoAA ratio of >0.8 was associated with significant improvement in aortic stenosis parameters compared to ratio of ≤0.8 without significant increase in complication rate.

CATEGORIES IMAGING: Non-Invasive

KEYWORDS Aortic valve stenosis, Balloon aortic valvuloplasty, CT guidance

TCT-326

Characteristic Coronary Flow Pattern Of Left Anterior Descending Artery Stenosis By Transthoracic Echocardiography

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BACKGROUND Coronary flow reserve (CFR) as detected by echocardiography correlate well with the angiographic degree of coronary stenosis whether significant or not. However, value of resting coronary flow velocities (CFV) and their pattern in predicting coronary artery disease (CAD) severity is not studied enough. The present study aimed to assess CFV and pattern of distal left anterior descending (LAD) artery of different stenosis using transthoracic echocardiography (TTE) to elucidate the possible association.

METHODS Coronary flow (CF) & CFV pattern were measured in distal LAD by TTE in 97 patients who were subjected for coronary angiography (CA) at our department for suspected CAD and were found to have LAD stenosis of different severity during the period from November 2013 to December 2014. Peak systolic velocity (PFVS), peak diastolic velocity (PFVD), average velocity (VA) and diastolic deceleration time (DDT) were obtained.

RESULTS The patients were enrolled in 3 groups, group I included 30 patients with normal CA, group II included 34 patients with LAD stenosis 50-69% and group III included 33 patients with LAD stenosis ≥70%. There was no significant difference between the studied groups regarding age and gender. There was no significant difference between the studied groups regarding PFVS, PFVD and VA ($p > 0.05$). While DDT showed significant shortening in group III (580 ± 19.3 ms versus 800.7± 6.4 ms in group I and 750. ±34.7 ms in group II, $p<0.001$) . A receiver-operating characteristic-derived DDT cut off point ≤655 ms was 100% specific and 100% sensitive for detecting severe LAD stenosis (>70%).

CONCLUSIONS In patients with suspected CAD, short DDT of distal LAD flow as detected by TTE can effectively detect severe LAD stenosis.

CATEGORIES IMAGING: Non-Invasive

TCT-327

Calcium Volume Score on Contrast-Enhanced Computed Tomography Prior to Transcatheter Aortic Valve Replacement: what's the most accurate threshold cutoff?

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BACKGROUND Previous publications have studied the predictive value of calcium volume score on computed tomographic angiographic (CTA) images for paravalvular leak (PVL), an important complication which leads to morbidity and mortality after transcatheter aortic valve replacement (TAVR). The threshold CT number in Hounsfield Units (HU) chosen to detect calcium on contrast-enhanced scans has not been standardized in the literature. Suggested thresholds in the literature range from 350 to 850 HU. A threshold near or below luminal attenuation (LA) will detect contrast as calcium where a threshold much higher than LA will only detect the most dense calcification. Our aim was to find the most accurate threshold to predict PVL post-TAVR.

METHODS 82 patients with severe aortic stenosis who underwent TAVR with the Corevalve prosthesis and who underwent pre-procedural CTA and intra-operative transesophageal echocardiography for PVL assessment were included. Luminal attenuation (LA) in HU was measured at the level of the aortic annulus. Total calcium volume score for the aortic valvar complex, from the left-ventricular outflow tract to the tips of the aortic valve leaflets, was measured using different threshold cutoff protocols. Receiver-operating characteristic (ROC) analysis was performed to assess predictive value for > mild PVL ($n = 11$).

RESULTS Mean LA was 460 ± 166 HU. Protocols using higher threshold cutoffs underestimated total calcium volume compared to those with lower cutoffs (Table 1). ROC analysis showed lower area under the curve (AUC) values for fixed threshold cutoffs of 650 or 850 HU (protocols 1-2) compared to those using a relative threshold to LA (protocols 3-6). Protocols 3-6 were significantly more predictive of > mild PVL than protocol 1 ($p < 0.05$ for each comparison of ROC curves). When comparing the AUC of protocol 4 to 2, the difference trends towards significance ($p = 0.056$). AUC for protocol 4 was numerically the highest of all techniques.

Table 1. Calcium scores and ROC analysis

Protocol	Threshold	Total volume (mm^3)	AUC	Sensitivity	Specificity	cutoff	p-value
1	Fixed 650 HU	1157 ± 1444	0.618	73	62	837.8	0.17
2	Fixed 850 HU	410 ± 571	0.743	82	64	358.7	0.0001
3	LA + 50 HU	1619 ± 1303	0.843	82	76	1815.5	<0.0001
4	LA + 100 HU	1036 ± 790	0.858	91	73	1181.9	<0.0001
5	LA x 1.25 HU	1119 ± 1150	0.825	73	72	1195.3	<0.0001
6	LA x 1.5 HU	705 ± 693	0.814	73	69	775.5	<0.0001

CONCLUSIONS Among the protocols studied for calcium volume scoring on contrast-enhanced CT, those based on threshold cutoffs which are relative to LA are more predictive of PVL post-TAVR than those which use fixed cutoffs. A threshold of LA + 100 HU may have the highest predictive value.

CATEGORIES IMAGING: Non-Invasive

KEYWORDS Computed tomography angiography, Paravalvular leak, TAVR

TCT-328

In Vivo Calculation of Endothelial Shear Stress Using Coronary Computed Tomography Angiography: Comparison with Invasive Coronary Angiography

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BACKGROUND It is vastly believed that regions with low endothelial shear stress (ESS) are prone to buildup of atherosclerotic plaques, contributing to development of coronary artery disease. The aim of this investigation was to develop a non-invasive approach for in-vivo assessment of ESS and to validate the computed ESS against invasive coronary angiography (ICA) derived ESS.

METHODS Patients with mild or intermediate coronary stenoses who underwent both CCTA and ICA were included for analysis. Two geometrical models of the interrogated vessels including the side branches were reconstructed separately from coronary computed tomography angiography (CCTA) and ICA images. Computational fluid dynamics was applied subsequently to calculate ESS, from which ESSCTA and ESSQCA were derived, respectively. Comparisons between ESSCTA and ESSQCA were performed on the same segments that were defined by the consecutive side branches in the CCTA and ICA models.